



Physical Evidence Program Update

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Physical Evidence Program Manager

Latent Prints / Impressions Staffing



- Fully staffed
- In training:
 - 1 in Western
 - 1 in Central
 - 1 in Central for Impressions

Latent Print Continuing Education



- Common Sense Digital Imaging
- Ethical Considerations in Latent Print Examinations and Testimony
- What if I don't agree? Approaches to Conflict Resolution in Latent Print Analysis
- Implementing the Expanded OSAC Conclusion Scale
- Discriminating Power of Friction Ridge Arrangements
- Beyond the Discriminating Power of Friction Ridge Arrangements – Applying What You Learned

Latent Print Database Search Results



- Latent Print vs Known Print
- AFIS/NGI Databases
- Search Criteria
- Additional Quality Assurance Steps
- Reporting
- Policy Notice
- Summary



Latent Print vs Known Print

- Latent prints are unknown, partial, often smudged and distorted, unintentional impressions of friction ridge skin deposited on the surface of items.
- Exemplars are known prints that are clear and complete representations of the friction ridge skin.



AFIS/NGI



- Automated Fingerprint Identification System (AFIS)
 - State system contains arrest and some applicant exemplars
 - NEC software
- Next Generation Identification (NGI)
 - Federal system contains arrest and some applicant exemplars as well as TSA Pre-Check cards
 - System also contains other biometric information not used for latent print searches
- Database searches are performed on latent prints recovered from evidence

AFIS/NGI

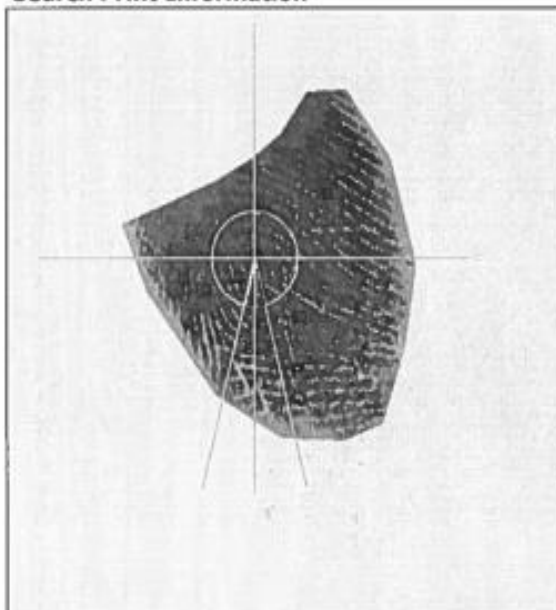


- Latent prints are coded (points or minutiae marked) by the software or an examiner
- Search is launched against the database
- Images that are visually similar to the latent print are presented to the examiner for comparison
- The system is designed to present known exemplars that look like the latent print

Latent Verify - HIT Report (Minutia Included)



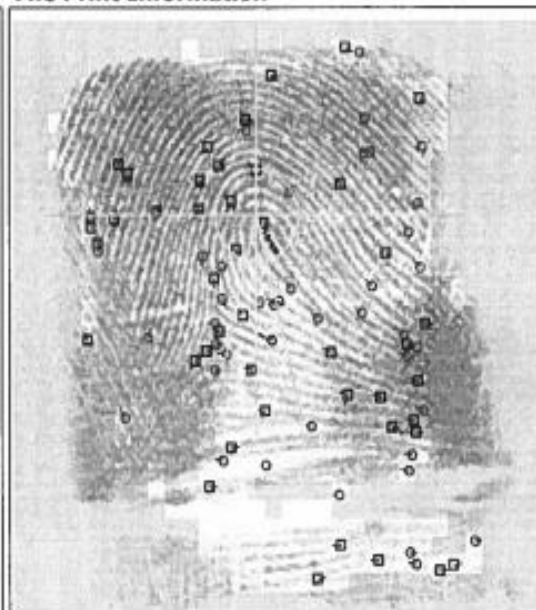
Search Print Information



Crime Code:
 Case No.:
 Lift No.:
 Item Number:
 Sex:
 Race:
 Agency Case Number:
 Agency ORI:
 Pattern Type:
 Finger Numbers:
 Adjacent Pattern Types:
 Minutia Count:
 Search Date/Time:
 Operator ID:
 Verify 1 ID:
 Verify 2 ID:
 Terminal ID:
 LOC Max.:
 Search Database:
 Matching Algorithm:

Memo:

File Print Information



Date Of Birth:
 Sex:
 Race:
 SID:
 Name:
 Palm Print Available:
 Date Of Arrest:
 Booking ORI:
 Adult Flag:
 OCA:
 Annotation Right:
 Annotation Left:
 Pattern Type:
 Reference Pattern:
 Quality Rolled:
 Quality Slap:
 Minutia Count Rolled:
 Minutia Count Slap:
 Input Date:
 Operator ID:
 Terminal ID:

Memo:

AFIS/NGI

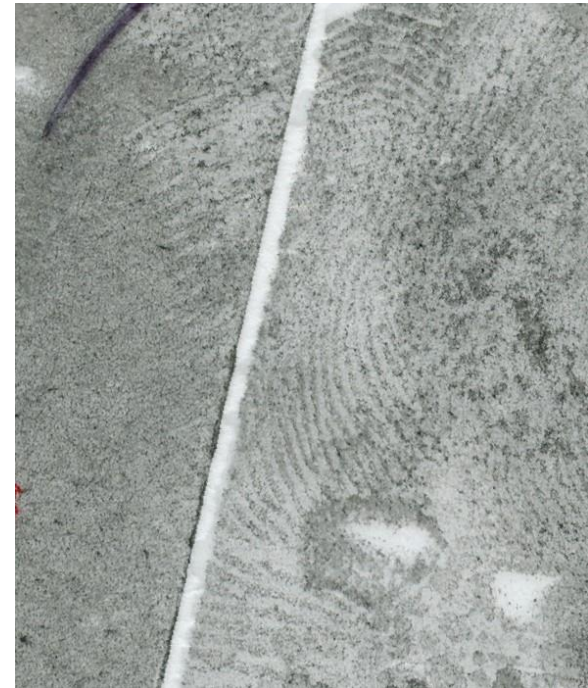
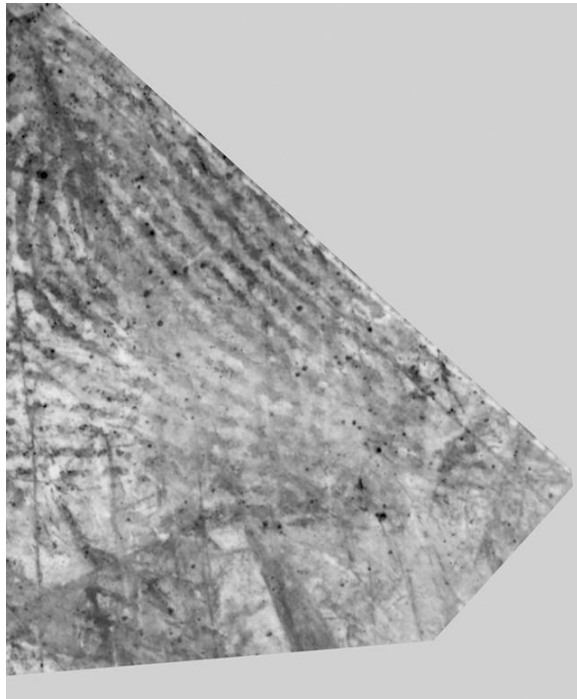


- Large database size combined with advancements in algorithm technologies present close non-matches (CNM)
- Complexity of latent print creates risk of CNM being reported as a match

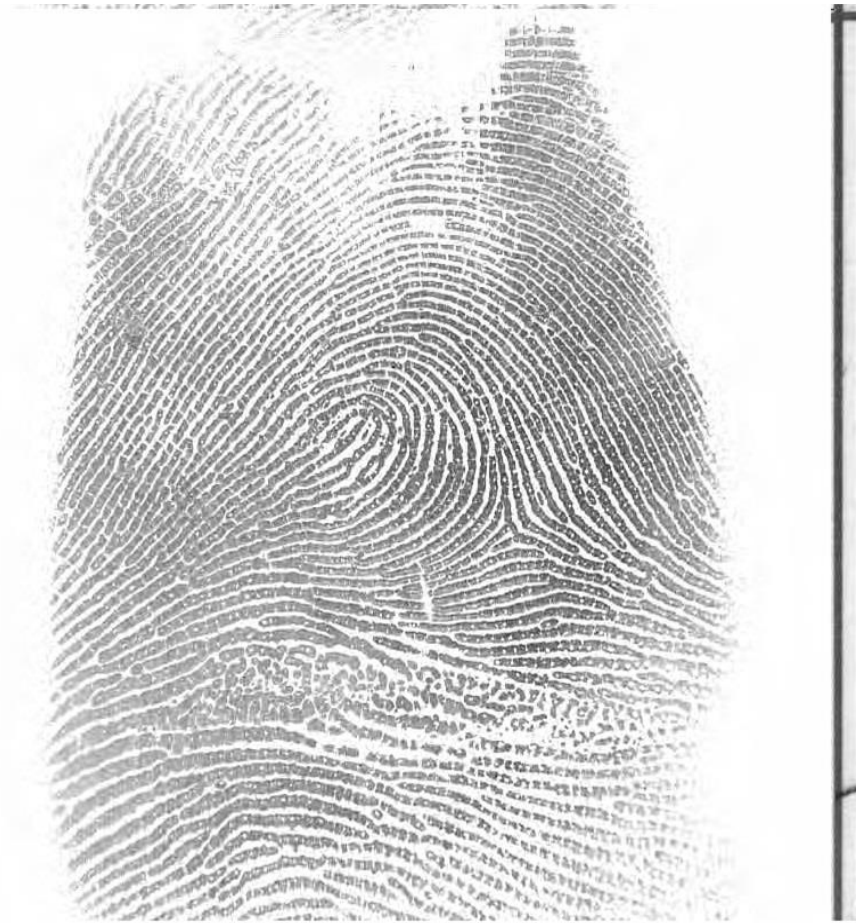
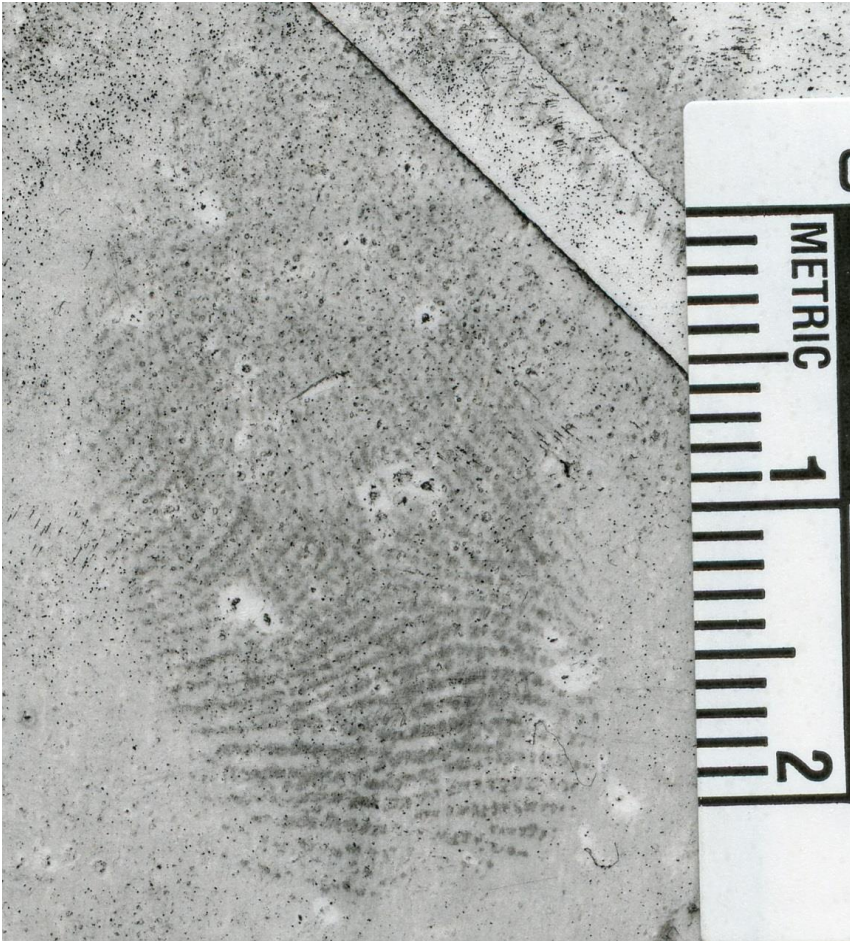
Search Criteria



- Patterns formed by the ridges can be common in certain areas of skin



Search Criteria



Search Criteria



11.2.9.2 Four complexity levels are possible as a result of the determination:

11.2.9.2.1 Complexity Level I: a latent print where the observed data does not provide an indication of anatomical region or orientation and any or all of the following factors are present: low specificity of features, significant distortion (e.g. rotational movement, multiple tap, superimposed impression, extreme pressure leading to tonal reversal, and slippage), high tolerances, and pattern forced area.

This level of complexity requires the additional quality assurance measures outlined in Section 12.2.2 of this manual.

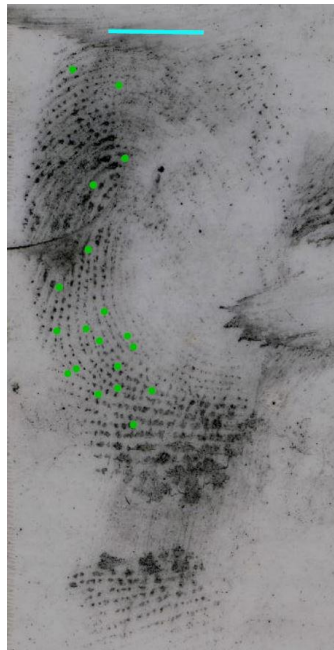
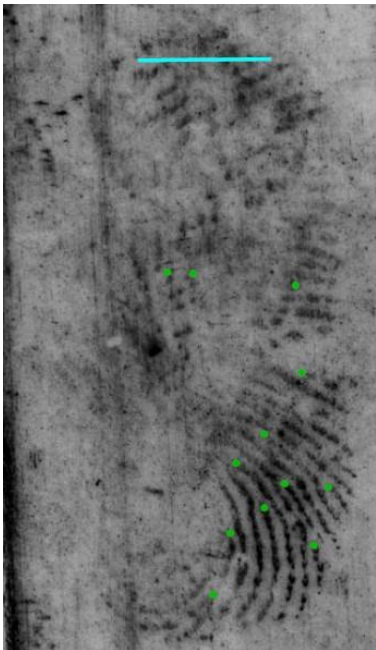
11.2.9.2.2 Complexity Level II: a latent print where the observed data provides an indication of the anatomical region and orientation and any or all of the following factors are present: low specificity of features, significant distortion (e.g. rotational movement, multiple tap, superimposed impression, extreme pressure leading to tonal reversal, and slippage), high tolerances, and pattern forced area.

This level of complexity requires the additional quality assurance measures outlined in Section 12.2.2 of this manual.

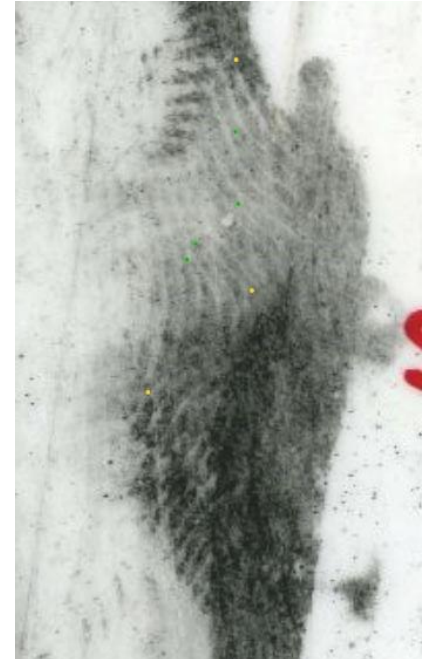
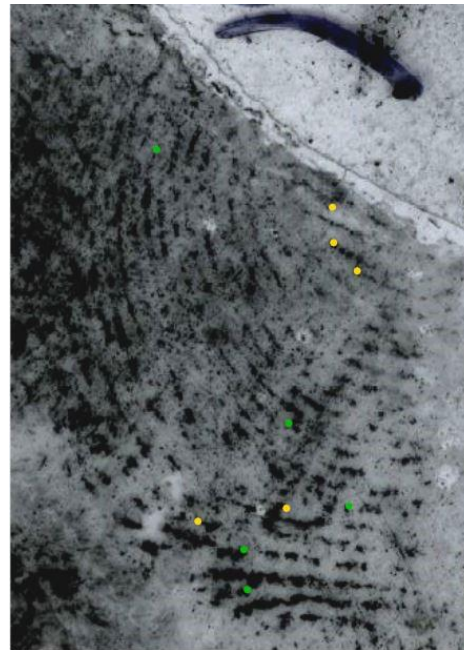
Search Criteria



Non-Complex



Complexity I & II



Additional Quality Assurance Steps



- 12.2.2 Prior to conducting a database search of a Complexity Level I or Level II latent print, the examiner shall consult with another examiner. The consult will result in either 1) agreement the print can be searched and vulnerable areas are documented (i.e. lack of specificity, distortion) or 2) agreement the print should not be searched or 3) the print is not searched due to lack of consensus. The consultation shall be documented.
 - 12.2.2.1 A consultation is not required if a Complexity Level I or Level II latent print is not searched in a database.
 - 12.2.2.2 A consultation is not required if a Complexity Level III or a Non-Complex latent print is searched in a database.
 - 12.2.2.3 If a Complexity Level I or Level II latent print is identified to an exemplar retrieved as the result of a database search, the examiner shall participate in a consultation regarding the comparison conclusion. It is acceptable for the consultations to be conducted by the same examiner due to a potential advantage of the examiner being aware of the complexity issues discussed prior to searching in the database. The comparison shall be verified by an examiner not involved in the consultation.

Reporting



Due to the nature of latent print *IP2* and given the higher chance of a coincidental match in a large database, similar corresponding characteristics could be observed in the friction ridge skin of a different person.



COMMONWEALTH of VIRGINIA

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NOTICE OF DFS POLICY CHANGE

To: All Agencies Served by DFS
From: Linda Jackson, Department Director 
Date: February 10, 2021
RE: Latent Print Database (AFIS/NGI) Search Results

The Latent Print Section utilizes the Virginia Automated Fingerprint Identification System (AFIS) and the Next Generation Identification (NGI) system to provide investigative information about individuals potentially associated with criminal events through the search of partial latent prints recovered from evidence against databases of known exemplars (fingerprints and palm prints).

The known exemplars obtained as a result of a database search could potentially contain characteristics very similar to those present in the partial latent print (considered a "close non-match"). A comparison conclusion is an examiner's opinion based upon the interpretation of the details present in the latent print and the known exemplar. Historically, examiners have been able to differentiate between a close non-match and an identification; however, due to the increasing size of the databases and the advancements in matching algorithms, this task is becoming more difficult. Accordingly, the Department has implemented additional quality assurance measures and reporting requirements to minimize the risks for more complex latent prints.

Below is an example of the language that will be included on the Certificate of Analysis for instances where the risk of a potential close non-match is higher due to the complexity of the latent print.

Due to the nature of latent print IP2 and given the higher chance of a coincidental match in a large database, similar corresponding characteristics could be observed in the friction ridge skin of a different person.

The result of a database search is intended to provide an investigative lead, and any possible connection or involvement of the individual to the case must be determined through further investigation.

Please contact the Latent Print Section Supervisor for your service area at the number listed if you have any questions or concerns.

Laboratory	Section Contact	Phone Number
Central (Richmond)	Amanda Lane	(804) 588-6029
Eastern (Norfolk)	Chris Claytor	(757) 355-5950
Northern (Manassas)	Jessica Davis	(703) 334-9752
Western (Roanoke)	Kate Adolf	(540) 283-5975

Summary



- New procedures include additional quality assurance steps for database searches of complex latent prints.
- The Department is confident in the conclusion reported.
- Investigating the result is part of the process.

Firearms and Toolmarks Staffing



- In recruit:
 - 1 in Western
- In training:
 - 1 in Northern
 - 1 in Central
 - 1 in Eastern

Firearms and Toolmarks

Continuing Education



- CSAFE Introduction to Machine Learning for Forensic Science
 - Day 1, two hour on-line presentation Learning Algorithms for Classification
 - Day 2, three hour on-line presentation Random Forests – How they work and Same Gun or Different Gun? – Quantifying the similarity between bullet striations

Firearms and Toolmarks



- Validation of the Cadre 3D scanner equipment
- Validation of Virtual Comparison Microscopy (VCM) for Comparison
- Validation of Virtual Comparison Microscopy (VCM) for Screening/Grouping

Validation

Cadre Equipment



- There is a statistical difference and variance between the gel's R_a values, but not the R_{sm} values.
- No statistical difference or variance was present related to the user or the environment.
- All measurements collected were within the acceptable quality assurance range.

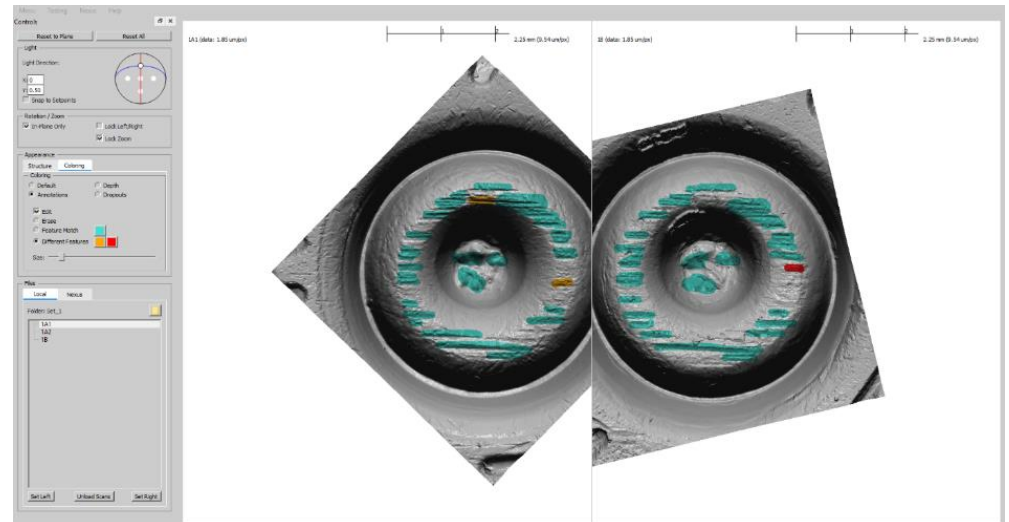
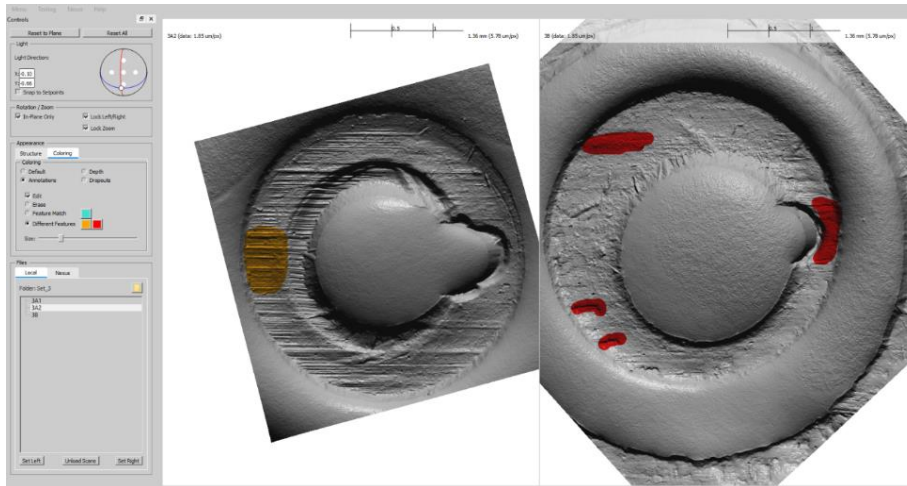
Validation

Cadre VCM Comparison



- 40 sets of images from CTS tests
- 20 sets of images from Hi-Point test
- Each examiner completed 10 CTS sets and 5 Hi-Point Sets
- No incorrect ID or Elimination
- 13 sets with differences in Elimination/Inconclusive or ID/Inconclusive
- 1 set all Inconclusive

Validation Cadre VCM Comparison



Validation Cadre Screening/Grouping



- Two sets of images were provided to the Firearms and Toolmarks Technical Resource Team for evaluation.
 - Set 1 ten images of cartridge cases fired in a Ruger Model P95DC or a Ruger Model P95.
 - Set 2 ten images of cartridge cases fired in either a Glock Model 35 or a Glock Model 23.

Firearms and Toolmarks



- Uncertainty of Measurement (UoM) in the Range Determination method.
 - The evaluation of the measurement uncertainty of the range determination method indicates a variability of approximately 15/16 of an inch with a 95% confidence. Due to the results being reported as a range for approximate muzzle-to-target distance determinations, the variability of less than one inch does not impact the interpretation of the result and will not be included on the CoA.

Firearms and Toolmarks



- Evaluation of the Uncertainty of Measurement (UoM) in the Trigger Pull method.
 - 8 firearms selected based on prevalence in the DFS firearms database, taken into consideration to cover different mechanism to cover the spectrum of typical submissions.
 - Each examiner will determine (average of 3 measurements) the trigger pull five times for each firearm. 70 data points for each firearm will be collected.
 - An Access Database similar to the barrel/overall measurement database will be used to collect data.
 - A UoM will be calculated from the collected data for each type of firearm. The data from all examiners will be combined for the evaluation, similar to the procedure followed for the overall/barrel length measurement and the distance determination.



DME Staffing

- Fully staffed and trained
- Turnaround times continue to improve
 - 15.0 days for a computer case;
 - 12.3 days for a mobile phone case;
 - 28.9 days for a video case;
 - 1.5 days for an image case;
 - Average = 18.7 days

DME



- National Center for Missing & Exploited Children (NCMEC)

DEFINITIONS

Identified Child: These exact hash values are associated with an image/video which appears to depict at least one (1) child previously identified by law enforcement. Please be advised that these hash values may be associated with apparent child pornography images/videos as well as files that do not contain apparent child pornography.

Recognized Hash Values: These exact hash values are associated with files previously submitted to the National Center for Missing & Exploited Children (NCMEC's) Child Recognition and Identification System. However, NCMEC has no additional information regarding these files, which may or may not contain apparent child pornography or depict identified children. As a result, these hash values will not be listed in the pdf version of the NCMEC Initial Hash Value Comparison Report.

Unrecognized Hash Values: These exact hash values are associated with images/videos that have not yet been submitted to NCMEC's Child Recognition and Identification System.



Toxicology Program Update

James W. Hutching, Ph.D.
Toxicology Program Manager

Toxicology



- Midwest Association for Toxicology and Therapeutic Drug Monitoring (MATT)
 - Virtual Meeting in late April 2021
 - Approximately 12 staff are attending
 - Virtual formats allow for more attendees with the low prices
- Hamilton Automated Liquid Handling Systems
 - Online
 - Enhancement of methodology

Toxicology



- Methodology
 - Miscellaneous Basic Drugs Quantitation and Confirmation by LCMSMS
 - Barbiturates Quantitation and Confirmation by LCMSMS
- Cannabinoids by LCMSMS
 - Funded by NIH grant – Dr. Wagner
 - Updating current method to move towards automation, separation of isomers

Toxicology Statistics during 2020



- Update - During pandemic, major reduction in vehicle miles traveled
- However....looking at the cases submitted:

	2019	2020	% Change
OCME	4239	5059	+19.3
DUID	2429	2892	+19.1
DUI	2283	2103	-7.9
Tox-Other	658	728	+10.6

Staffing



- Toxicology - Update
 - Retirement of Dr. James Kuhlman (Supervisor – W-TX)
 - New Hires
 - W-TX Supervisor – Dr. Trista Wright
 - Forensic Scientist in C-TX
 - In background check, FS and FLS in C-TX
 - Trainees
 - W – Forensic Toxicologist
 - C – 2 FS
 - In Recruit
 - W – Forensic Toxicologist
- Breath Alcohol (BA) – fully staffed

Breath Alcohol



- In-Person Training Continues with great success
- With decreased class size, DFS had to increase the number of classes offered

Grants



- DMV Highway Safety Office – just reapplied
 - Awarded to continue to offer licensing training and to retain one Forensic Scientist
 - Purchase replacement classroom engagement tools
 - Maintain paperless capabilities
- Dept. of Criminal Justice Services Coronavirus Grant
 - Awarded grant to ensure continuity of operations during pandemic/closures
 - Purchased smartphones and Adobe software
 - Allows for paperless processing of instrument installation and removal

BA Statistics – COVID-19



- Update - Compared to 2019, January and February 2020 were on track to have a comparable number of breath tests
- Starting in March 2020, there was a marked reduction in breath tests
- March 2021 compared to March 2020 = -5.4%*
- March 2021 compared to March 2019 = -25%

Month	% Change
March 2020	-29.4
April	-51.0
May	-32.4
June	-33.4
July	-23.1
August	-23.1
September	-19.3
October	-12.2
November	-26.4
December	-34.0
January 2021	-19.6
February	-27.1
March*	-5.4



THANK YOU!